



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/772,722	02/04/2004	Jean-Marie Sleewaegen	09997.0088US11	5603

23552 7590 05/08/2006

MERCHANT & GOULD PC
P.O. BOX 2903
MINNEAPOLIS, MN 55402-0903

EXAMINER

ISSING, GREGORY C

ART UNIT PAPER NUMBER

3662

DATE MAILED: 05/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/772,722

Applicant(s)

SLEEWAEGEN, JEAN-MARIE

Examiner

Gregory C. Issing

Art Unit

3662

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2/04</u> . | 6) <input type="checkbox"/> Other: ____. |

Art Unit: 3662

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, lines 7-9, the comma separating the phrase "to acquire a baseband signal" appears improper. As a result of the comma, it is unclear to what the language "representing said PRN code" refers. In claim 1, lines 18- are not clearly written. Particularly, with respect to the commas separating "equating said multipath error to a predefined function of said $M+N+1$ correlation values," it is not clear if this is descriptive of the "predefined formula" or if this represents a second step, for example, "calculating . . . and equating" If the "equating said multipath . . ." is descriptive of the "predefined formula" then the comma is misplaced.

The values "M" and "N" are undefined in the claims.

The language "replica's" is grammatically incorrect in numerous locations of all of the claims.

The "predefined function" is not adequately disclosed in the claims. The claim fails to provide definite language as to the scope of the predefined function.

Claim 7 is indefinite due to the lack of clarity in line 15 with respect to the ":" (colon)". The same problem with respect to a misplaced colon exists in claims 12, 14, 19, and 21.

Claim 9 is indefinite since it appears to be contradictory to the claims from which it depends. Claim 1 defines calculation of an estimate of the multipath error on the basis of a predefined function of the $M+N+1$ correlation values wherein the predefined formula is a linear combination of the $M+N+1$ correlation values. Each of the $M+N+1$ correlation values is derived from a respective $M+N+1$ code replica. Thus, the use of only two replicas fails to properly further limit the claims from which it depends. The same problem exists in claim 16.

Claim 10 is indefinite since it is not clear if it is complete or not. What is the relationship of the "low pass filter" on the top of page 33 with respect to the receiver? Moreover, claim 10 merely consists of a listing of parts whose interrelationships are not defined.

Art Unit: 3662

Claims 12-15 and 19-21 are indefinite since the recitation of both an apparatus and method of using that apparatus in the same claim renders the claim indefinite under 35 USC 112 (IPXL Holdings LLC v. Amazon.com Inc, 77 USPQ2D 1140 (CA FC 2005)).

Claims 13 and 20 are indefinite since each fails to further limit the independent claim from which it depends, see reasons with respect claim 9 above.

In claim 19, the uses of a colon in the subparagraphs related to the method are misplaced.

3. Figures 1, 2, 3a, and 3b should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

4. The drawings are objected to because the boxed elements fail to fairly represent what they are or what they perform; for example, in Figure 4, elements 2, 23, 24, 10, 3 and 21 are not clearly indicative of what they are. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Art Unit: 3662

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

6. Claims 1, 2, 10, 17 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Kumar et al (5,918,161).

Kumar et al disclose the claimed method and apparatus for reducing multipath signal error in processing GPS signals including tapped delay line 59 for providing a plurality of PRN replicas, a respective plurality of mixers 8, 12, 16 and accumulators 10, 14, 18 for generating a plurality of correlation values R that are provided to a module for calculating a linear combination of correlation values by differencing pairs of inputs. The outputs of the linear combination processor is provided to estimator 38 that uses discriminator values to estimate the multipath channel response which is used to estimate a multipath free result. The use of a low pass filter in a satellite receiver to remove unwanted signals is inherent. Use of hardware and/or software is conventional and inherent in state of the art navigation receivers.

7. Claims 1, 2, 10, 17 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Enge et al (6,031,882).

Art Unit: 3662

8. Enge et al disclose the claimed method and apparatus for removing multipath from received navigation signals including as shown in Figure 7 a conventional and known system for mixing a received signal with a carrier signal 75, mixing the output of the mixer 75 in a plurality of at least four channels with a plurality of PRN replicas tapped off a delay line 79, accumulating the results of the mixed received signal/replicas to generate a plurality of correlation results which are used for code tracking by identifying the correlation peak. Additionally, the multipath signal strengths and phases are estimated by a least mean squares analysis using multiple sampling of a correlation function of an expected signals and an arriving composite signal that includes the direct signal and one or more multipath signals (5:8-15). The processing for determining the errors/residuals resulting from multipath are determined by minimizing the sum of the correlation results using one of a selected linear combination as set forth in equations (11) or (20) for example.

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

10. Van Nee (5,615,232) discloses a method and apparatus for processing GPS signals for determining range and subsequently position including, as shown in Figure 9, mixer 34 for mixing at a first input 35 a received signal that may be amplified, downconverted and digitized, with a carrier signal at a second input 36, mixing the received signal with a plurality of PRN code replicas from a tapped delay line 70 in multipliers 40, integrators 45 for accumulating the samples at each input thereof for generating a plurality of correlation values $R_x(\zeta)$ provided at inputs 51 of a processor 50.

11. Cahn et al (6,917,644) disclose a spread spectrum receiver with multi-path correction, see for example Figure 14, wherein residual code phase errors resulting from multipath interference can be detected, determined, and/or corrected (27:26-28). The multipath error may be detected and if detected the sign of the error may be determined by comparison of the ratio of amplitude of the prompt correlation to the equal amplitudes of the early and late correlations offset symmetrically from the prompt. The relative magnitude of the multipath error is determined by scaling the ratio of the sum of the early and late correlation amplitudes divided by the amplitude of the prompt correlation. Therefore, a computation correction to the pseudorange can be made proportional to the amplitude of the (Early+Late)/Prompt

Art Unit: 3662

correlations to reduce or eliminate the effect of multipath errors such that the error may be used to computationally refine the pseudorange and therefore the position computation (29:33-30:20).

12. Raby et al (6,252,863) disclose a multipath compensation method for use in a GPS receiver comprising determination of a pseudorange difference defined by a product of a proportionality constant K and a ratio of a first linear combination of the measured amplitudes of a plurality of correlation results ACM divided by a second linear combination of these measured amplitudes. After the pseudorange corrections due to multipath signal contributions are determined, these corrections are combined with the uncorrected pseudorange values to produce corrected pseudorange values. The proportionality constant has a theoretical value that is determinable from an examination of an idealized autocorrelation function that would be received in the absence of multipath.

13. Brenner (6,987,820) discloses a processor 16 which uses the punctual, late and early correlation outputs to determine whether a fault exists wherein the existence of a fault is indicative of multipath. A processor determines a plurality of correlation results denoted by I_i which are used to determine RMS values denoted by R_i so that a plurality of differences d_{ij} are derived. An expected difference is subtracted from all or a subset of the measured differences d_{ij} and compared to a threshold in order to determine the existence of a fault.

14. Valio (6,658,048) discloses a GPS receiver having means for minimizing the effects of multipath disturbances including mixing (27) a digitized received signal (19) with a replica of the carrier signal (21), multiplying the signal (27) with a plurality of delayed PRN codes (25) including at least four replicas (E1, E2, E, P, and L) one of which is the punctual replica (P), calculating a respective plurality of correlation values (26), and using the plurality of correlation values to subsequently determine the code phase information required for determining range between the transmitting satellite and the GPS receiver. Additional correlation values (E1 and E2) are used to further determine if there are multipath components present and the subsequent use to better determine timing estimation. Valio does not disclose the claimed estimation of multipath error using a linear combination of all of the correlation values, each of which is normalized by the correlation value of the punctual replica.

Art Unit: 3662

15. Ray et al ("GPS Code and Carrier Multipath Mitigation Using a Multiantenna System") teaches that multipath is a major source of error in GPS and suggests the use of a Kalman filter which uses a combination of available information from the antennas in a multiantenna cluster to estimate various multipath parameters, which are used to estimate and compensate code range and carrier phase multipath.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregory C. Issing whose telephone number is (571)-272-6973. The examiner can normally be reached on Monday - Thursday 6:00 AM- 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Tarcza can be reached on (571)-272-6979. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Gregory C. Issing
Primary Examiner
Art Unit 3662

gci